

3.4 Solve by Factoring

Word Problems p 163 q#13

The manager of a hardware store knows that the weekly revenue function for batteries sold can be modelled with $R(x) = -x^2 + 200x + 30\,000$ where both the revenue ($R(x)$) and the price x at a package of batteries are measured in dollars. According to the model what is the maximum revenue the store will earn?

Mar 9-9:15 AM

$$R(x) = -x^2 + 200x + 30\,000$$

$$R(x) = -(x^2 - 200x - 30\,000)$$

$$R(x) = -(x^2 - 300x + 100x - 30\,000)$$

$$R(x) = -(x(x-300) + 100(x-300)) - 200 \begin{matrix} A \\ M \end{matrix} \begin{matrix} -30\,000 \\ -300 + 100 \end{matrix}$$

$$R(x) = -(x-300)(x+100)$$

300 -100

Mar 9-9:22 AM

Substitution to find yield

$$R(x) = -x^2 + 200x + 30\,000$$

$$R(x) = -(x-300)(x+100)$$

$$R(100) = -[(100-300)(100+100)]$$

$$R(100) = -[(-200)(200)]$$

$$R(100) = -[-40\,000]$$

$$R(100) = 40\,000$$

The max revenue is \$40,000 when you sell packages for \$100

Mar 9-9:26 AM

10) $P(x) = 324x - 54x^2$ p162
 $P(x) = 100\%$ of dollars $x = 100\%$ of snowboards
 Break Even $P(x) = -54x^2 + 324x$
 Be Profitable $= -54x(x-6)$

The company breaks even at 0 and 6000 snowboards.
 The company is profitable b/w 1 and 5999

5+6
2
= 11

$$R(1) = -54(1)^2 + 324(1)$$

$$R(3) = -54(3)^2 + 324(3)$$

$$= -54(9) + 972$$

$$= -486 + 972$$

$$R(3) = 486$$

$$(3, 486)$$

When they sell 3000 snowboards they will make a max profit of \$486,000

Mar 9-10:01 AM

11. A rock is thrown down from a cliff that is 180 m high. The function $h(t) = -5t^2 - 10t + 180$ gives the approximate height of the rock above the water, where $h(t)$ is the height in metres and t is the time in seconds. When will the rock reach a ledge that is 105 m above the water?

$$h(t) = -5t^2 - 10t + 180$$

$$105 = -5t^2 - 10t + 180$$

$$0 = -5t^2 - 10t + 180 - 105$$

$$0 = -5t^2 - 10t + 75$$

$$0 = -5(t^2 + 2t - 15)$$

$$0 = -5(t+5)(t-3)$$

-5 +3 +5 -15

(-5, 105) (3, 105) Roots

At 3 seconds the rock is 105m above the ground.

Oct 11-11:20 AM

Mar 9-9:53 AM


$p | 62 - 163$
 $9, 10, 11, 12, 14, 15$

$\#9$ $A(w) = -2w^2 + 48w$
 $A(w) = -2w(w - 24)$

$0 + 24$ Sub) 0 24
 $x = 12$ $A(w) = -2(12)(12 - 24)$
 $= -24(-12)$
 $= +288$

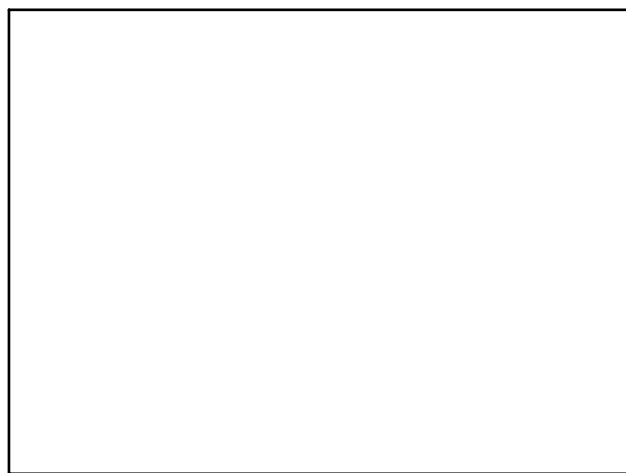
The max area of the fence is 288 m^2 with
 a width of 12 m .

Mar 9-9:27 AM



$\text{Profit} = \text{Rev} - \text{Cost}$
 $\text{Profit} = [5x^2 + 21x] - [2x + 10]$
 $= 5x^2 + 21x - 2x - 10$
 $= 5x^2 + 19x - 10$

Mar 9-10:04 AM



Oct 7-10:49 AM